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Field Change #2 7/24/97

Appendix 3

Collecting Samples to Determine if Spent Granular Activated Carbon has Remained Free from Radiological Contamination

This appendix is a change (addition) to the original SAP issued for the Mound Site Source Removal Project on February 18, 1997, and does not constitute a complete revision to the original SAP. This change is being performed to determine if Granular Activated Carbon (GAC), being added to the TDU treatment system, has any increase in radioactivity after being used during the processing of soils from the Mound Site Source Removal Project. The original planning for the Mound Site Source Removal did not include the use of GAC in the treatment system. However, though not required by regulation, the use of GAC in the TDU system to adsorb VOCs, will reduce the emission of these compounds, thereby reducing risk to workers.

Samples of the GAC will be collected for radiochemical analyses before and after processing. The results will be evaluated by Radiological Engineering personnel to determine if the GAC may be provided with an unrestricted release from RFETS. If the GAC is provided with an unrestricted release, disposition of the spent GAC will be the responsibility of McLaren/Hart, Inc. (the TDU subcontractor). If the GAC does contain "DOE added radioactive materials", disposition will be the responsibility of RFETS. If the GAC is provided with an unrestricted free release after use, any additional sampling will be the responsibility of McLaren/Hart, Inc.

Baseline Sampling of the GAC

The TDU will utilize the GAC at the end of the treatment process to absorb VOCs that are stripped from the soil during heating. The potential exists for radioisotopes to contaminate the GAC and therefore, pre-treatment radiological samples are needed to baseline the material. Approximately 12-13 yd^3 of GAC material will be sampled. Since there is no radiological data available for the new GAC, seven (7) grab samples will be collected (one sample from seven of ten (randomly selected from the ten) sacks of "virgin" GAC delivered to the job site) to establish the baseline. The number of proposed samples will allow calculation of a mean value for each radionuclide, with an associated 90% confidence level. These samples will be collected as grabs directly from the delivery sacks and into the sample containers (scoopes may be used at the discretion of the sample team, and will be noted on the sample logsheet). Decontamination will not be required between individual sampling locations during the baseline sampling of the virgin GAC. Samples will be analyzed for isotopic plutonium, americium, and uranium in accordance with the RFETS *Statement of Work for Analytical Measurements*, current revision.

Post Treatment Sampling of the GAC

The spent GAC (i.e., following its use in air stripping) will be sampled for the same radionuclides stated above. Results will dictate packaging, disposition and shipping requirements. Samples will be collected in accordance with to the "Random Sampling Within

Segments" methodology per Gilbert, R. O., Statistical Methods for Environmental Pollution Monitoring, 1987. The samples will be collected from the GAC unit. The dimensions of the GAC unit are 8' x 10' with a depth of material (GAC) no less than 4' (Figure A3-1). Sample ports, manholes and the GAC unit's inlets are located along the top and sides of the unit to gain access to the material. Consistent with the sampling for the GAC baseline, seven samples of the spent GAC will be collected to derive an average value. The GAC will be sampled at randomly selected pre-identified locations and a 90% confidence level on the mean will again be performed and statistically compared to the baseline results. In order to have the unrestricted release of the GAC, the radiochemistry results of the spent GAC must be statistically the same as (i.e., not statistically greater than) the baseline or "virgin" GAC.

The randomly selected locations were generated by dividing the top (exposed surface) of the GAC into six equal area rectangles and collecting a sample from one of three randomly selected points within the rectangle. To increase the total number of samples from six to seven for better comparison with the baseline sampling, a seventh sampling location was randomly selected from one of the points within one of the equal area rectangles. Figure A3-2 depicts the randomly generated sampling positions. Because of access limitations, these points may be moved to the closest point in which a sample can be collected. Since the air flow from the ovens moves across the top of the material and flows down and out of the bottom of the GAC unit, surface samples collected from the top of the material will yield the most likely area to detect radiological contamination, if present. Samples will be collected using a scoop equipped with an extension arm as appropriate. Sampling equipment substitutions are acceptable if justified and described on the sample logsheets. One duplicate will be collected as a QC sample. Decontamination will not be required between individual sampling locations within the GAC unit. Equipment rinsate samples will not be collected and as such all detections will be considered real. Samples will be analyzed for isotopic plutonium, americium, and uranium in accordance with the RFETS *Statement of Work for Analytical Measurements*, current revision. The spent GAC will be analyzed by the same laboratory and under the same analytical protocols as the blank "virgin" GAC samples.

Evaluation of Sample Results

Average (mean) values between the blank (baseline) samples and the spent GAC samples will be compared to determine if they are statistically different. If spent GAC radionuclide activities (i.e., any one isotope level) are statistically greater than those measured from the blank (or background) GAC, based on statistical averages from the two lots of material, than the spent GAC will be managed as contaminated with radionuclides.

A routine statistical test for comparing mean values will be implemented for decision-making as to whether the spent GAC is contaminated (90% confidence that the spent GAC mean value is greater that the baseline (background) GAC mean value. The hypothesis test is based on the Students T statistic, and is given in Section 3.3 of Dovich (1992).

Figure A3-1 Configuration of the GAC Unit

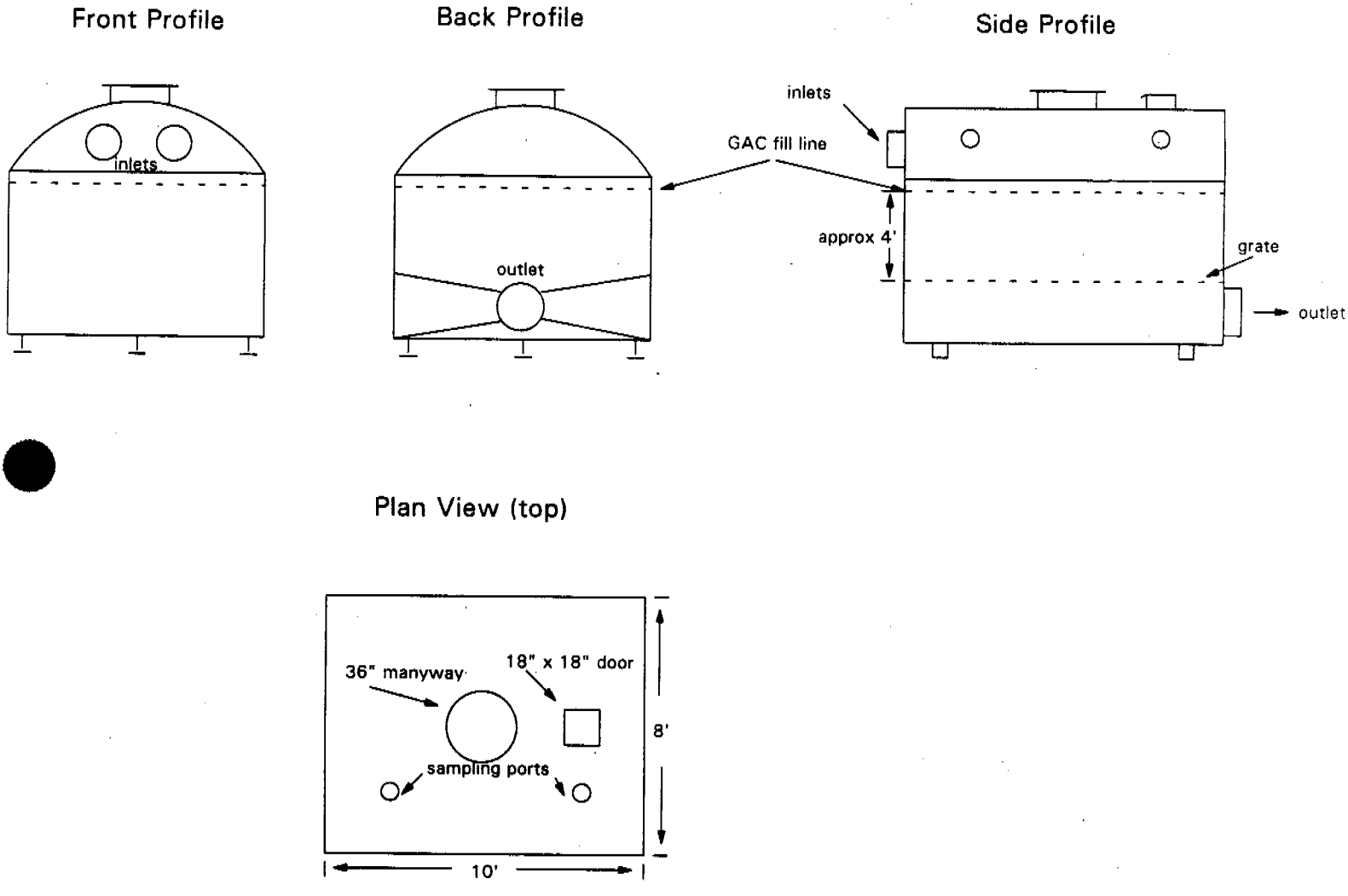
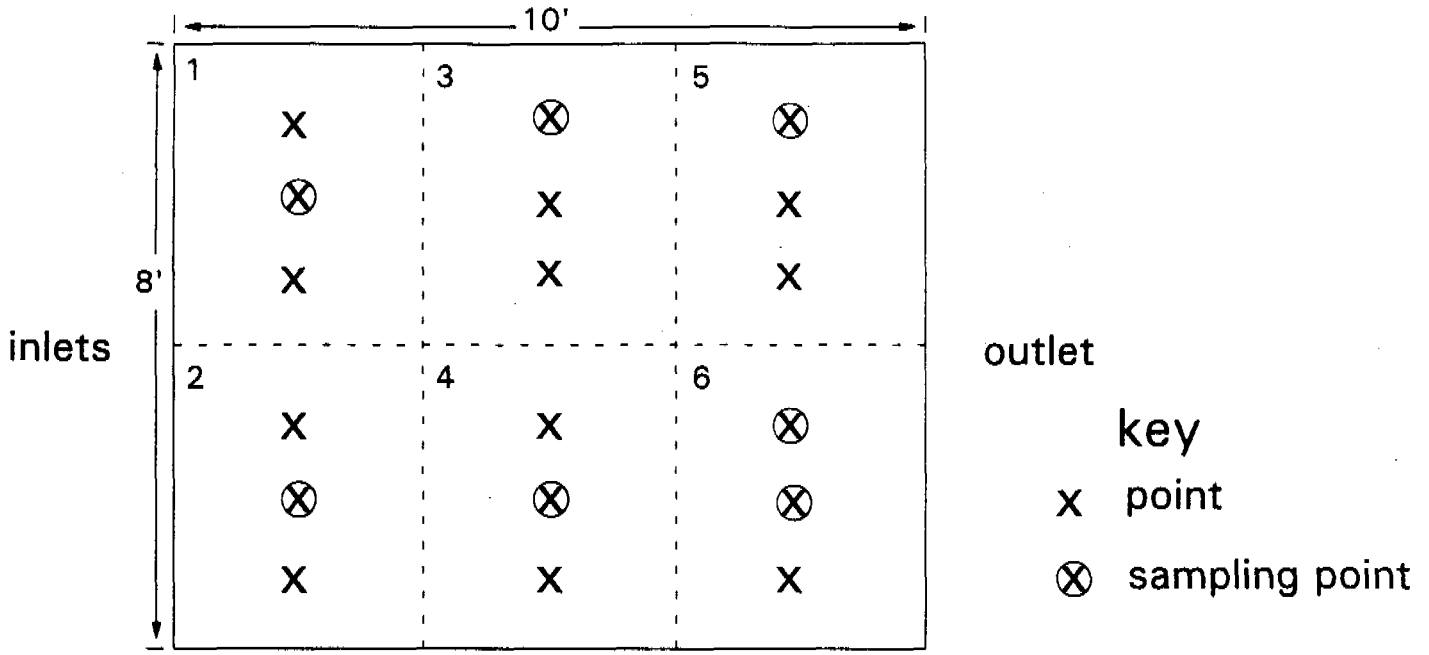


Figure A3-2 Location of Randomly Generated Sample Locations within the GAC Unit



References

Dovich, Robert, A., 1992. Quality Engineering Statistics. ASQC Quality Press, Milwaukee, WI

Gilbert, R. O., 1987. Statistical Methods for Environmental Pollution Monitoring, 1987.